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CLAIMS

1. (Previously presented) An isolated polypeptide, comprising an amino acid sequence selected from SEQ ID NOS: 14 and 16.

2. (Previously presented) An isolated polypeptide, comprising an amino acid sequence selected from SEQ ID NOS: 14 and 16; or a conservative variant thereof.

3. (Previously presented) An isolated polypeptide, comprising an amino acid sequence selected from SEQ ID NOS: 2 and 8.

4. (Canceled).

5. (Currently amended) A COX-1 variant binding agent, which binds an amino acid sequence selected from ~~SEQ ID NOS: 14 and 16~~ SEQ ID NOS: 14 and 16; or an epitope thereof.

6. (Original) The binding agent of claim 5, wherein said binding agent is an antibody, or antigen binding fragment thereof.

7. (Original) A cell, comprising the exogenously expressed polypeptide of claim 1, 2, or 3.

8. (Withdrawn) A method for identifying a compound that modulates a COX-1 variant, comprising:

a) contacting said COX-1 variant with a compound, wherein said COX-1 variant is an isolated COX-1 variant or a COX-1 variant over-expressed in a genetically engineered cell, and

b) determining the level of an indicator, which correlates with modulation of a COX-1 variant,

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wherein an alteration in the level of said indicator as compared to a control level indicates that said compound is a compound that modulates a COX-1 variant.

9. (Withdrawn) The method of claim 8, wherein said alteration is an increase
5 in the level of said indicator.

10. (Withdrawn) The method of claim 8, wherein said alteration is a decrease in the level of said indicator.

10 11. (Withdrawn) The method of claim 8, wherein said COX-1 variant in step (a) is the polypeptide of claim 2.

12. (Withdrawn) The method of claim 8, wherein said COX-1 variant in step (a) is the polypeptide of claim 3.

15 13. (Withdrawn) The method of claim 8, wherein said COX-1 variant in step (a) is an isolated COX-1 variant polypeptide.

14. (Withdrawn) The method of claim 8, wherein said COX-1 variant in step
20 (a) is a COX-1 variant over-expressed in a genetically engineered cell.

15. (Withdrawn) The method of claim 14, wherein said COX-1 variant is exogenously expressed.

25 16. (Withdrawn) The method of claim 8, wherein said indicator is prostaglandin E2 (PGE2).

17. (Withdrawn) The method of claim 8, wherein said compound is a small molecule.

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18. (Withdrawn) The method of claim 8, wherein said compound is a polypeptide.

5 19. (Withdrawn) A method for identifying a compound that specifically binds to a COX-1 variant, comprising:

a) contacting said COX-1 variant with a compound, wherein said COX-1 variant is an isolated COX-1 variant or a COX-1 variant over-expressed in a genetically engineered cell, and

10 b) determining specific binding of said compound to said COX-1 variant.

20. (Withdrawn) The method of claim 19, wherein said COX-1 variant in step (a) is the polypeptide of claim 2.

15 21. (Withdrawn) The method of claim 19, wherein said COX-1 variant in step (a) is the polypeptide of claim 3.

22. (Withdrawn) The method of claim 19, wherein said COX-1 variant in step (a) is an isolated COX-1 polypeptide.

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23. (Withdrawn) The method of claim 19, wherein said COX-1 in step (a) is a COX-1 variant over-expressed in a genetically engineered cell.

24. (Withdrawn) The method of claim 23, wherein said COX-1 variant is
25 exogenously expressed.

25. (Withdrawn) The method of claim 19, wherein said contacting occurs in vitro.

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26. (Withdrawn) The method of claim 19, wherein said compound is a small molecule.

27. (Withdrawn) The method of claim 19, wherein said compound is a polypeptide.

28. (Withdrawn) A method for identifying a compound that differentially modulates a COX-1 variant, comprising:

- a) contacting said COX-1 variant with a compound, wherein said COX-1 variant is an isolated COX-1 variant or a COX-1 variant over-expressed in a genetically engineered cell;
- b) determining the level of an indicator which correlates with modulation of said COX-1 variant;
- c) contacting a second COX enzyme with said compound;
- d) determining the level of a corresponding indicator which correlates with modulation of said second COX enzyme; and
- e) comparing the level of the indicator from step (b) with the level of the corresponding indicator from step (d), wherein a different level of the indicator from step (b) compared to the level of the corresponding indicator from step (d) indicates that said compound is a compound that differentially modulates said COX-1 variant.

29. (Withdrawn) The method of claim 28, wherein said second COX enzyme is a different COX-1 variant.

30. (Withdrawn) The method of claim 28, wherein said second COX enzyme comprises the amino acid sequence SEQ ID NO: 10, or a functional fragment thereof.

31. (Withdrawn) The method of claim 28, wherein said second COX enzyme comprises the amino acid sequence SEQ ID NO: 26, or a functional fragment thereof.

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32. (Withdrawn) The method of claim 28, wherein the level of said indicator from step (b) is greater than the level of said corresponding indicator from step (d).

5 33. (Withdrawn) The method of claim 28, wherein the level of said indicator from step (b) is less than the level of said corresponding indicator from step (d).

34. (Withdrawn) The method of claim 28, wherein said COX-1 variant in step (a) is the polypeptide of claim 2.

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35. (Withdrawn) The method of claim 28, wherein said COX-1 variant in step (a) is the polypeptide of claim 3.

36. (Withdrawn) The method of claim 28, wherein said COX-1 variant in step (a) is an isolated COX-1 polypeptide.

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37. (Withdrawn) The method of claim 28, wherein said COX-1 variant in step (a) is a COX-1 variant over-expressed in a genetically engineered cell.

20 38. (Withdrawn) The method of claim 37, wherein said COX-1 variant is exogenously expressed.

39. (Withdrawn) The method of claim 28, wherein said indicator in step (b) is prostaglandin E2 (PGE2).

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40. (Withdrawn) The method of claim 28, wherein said compound is a small molecule.

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41. (Withdrawn) The method of claim 28, wherein said compound is a polypeptide.

42. (Withdrawn) A method for identifying a compound that differentially binds to a COX-1 variant, comprising:

a) contacting said COX-1 variant with a compound, wherein said COX-1 variant is an isolated COX-1 or a COX-1 variant over-expressed in a genetically engineered cell;

b) determining specific binding of said compound to said COX-1 variant;

c) contacting a second COX enzyme with said compound;

d) determining specific binding of said compound to said second COX enzyme; and

e) comparing the level of specific binding from step (b) with the level of specific binding from step (d), wherein a different level of specific binding from step (b) compared to the level of specific binding from step (d) indicates that said compound is a compound that differentially binds to a COX-1 variant.

43. (Withdrawn) The method of claim 42, wherein said second COX enzyme is a different COX-1 variant.

44. (Withdrawn) The method of claim 42, wherein said second COX enzyme comprises the amino acid sequence SEQ ID NO: 10, or a functional fragment thereof.

45. (Withdrawn) The method of claim 42, wherein said second COX enzyme comprises the amino acid sequence SEQ ID NO: 26, or a functional fragment thereof.

46. (Withdrawn) The method of claim 42, wherein said different level of specific binding is an increased level of binding.

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47. (Withdrawn) The method of claim 42, wherein said different level of specific binding is a decreased level of binding.

48. (Withdrawn) The method of claim 42, wherein said COX-1 variant in step
5 (a) is the polypeptide of claim 2.

49. (Withdrawn) The method of claim 42, wherein said COX-1 variant in step
(a) is the polypeptide of claim 3.

10 50. (Withdrawn) The method of claim 42, wherein said COX-1 variant in step
(a) is an isolated COX-1 polypeptide.

51. (Withdrawn) The method of claim 42, wherein said COX-1 variant in step
(a) is a COX-1 variant over-expressed in a genetically engineered cell.

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52. (Withdrawn) The method of claim 51, wherein said COX-1 variant is
exogenously expressed.

53. (Withdrawn) The method of claim 42, wherein said contacting occurs in
20 vitro.

54. (Withdrawn) The method of claim 42, wherein said compound is a small
molecule.

25 55. (Withdrawn) The method of claim 42, wherein said compound is a
polypeptide.

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56. (Withdrawn) An isolated nucleic acid molecule, comprising a nucleotide sequence that encodes a polypeptide comprising

a) an amino acid sequence having at least 50% amino acid identity with SEQ ID NO: 10, and

5 b) an amino acid sequence selected from SEQ ID NOS: 20, 22 and 24; or a conservative variant thereof.

57. – 60. (Canceled).

10 61. (New) An isolated nucleic acid molecule, comprising a nucleotide sequence that encodes an amino acid sequence selected from SEQ ID NOS: 2 and 8.

15 62. (New) An isolated nucleic acid molecule, comprising a nucleotide sequence selected from SEQ ID NOS: 1 and 7.

63. (New) A vector, comprising the isolated nucleic acid molecule of claim 61.

64. (New) A vector, comprising the isolated nucleic acid molecule of claim 62.

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65. (New) A host cell, comprising the vector of claim 63.

66. (New) A host cell, comprising the vector of claim 64.